

政府總部
環境運輸及工務局
香港花園道美利大廈



Environment, Transport
and Works Bureau
Government Secretariat
Murray Building, Garden Road,
Hong Kong

Ref. : ETWB(W) 810/83/02

Group : 5, 12

26 October 2004

Environment, Transport and Works Bureau
Technical Circular (Works) No. 24/2004

Specification Facilitating the Use of Concrete Paving Units
Made of Recycled Aggregates

Background

Local construction activities produce some 20 million tonnes of construction and demolition (C&D) materials a year, of which about 10% are inert hard materials (e.g. broken concrete) suitable for recycling into aggregates for reuse in construction works. Recycling provides an alternative outlet for such hard materials, which otherwise would have displaced the soft fill materials in reclamation projects or taken up precious landfill space. Recycling also helps conserve natural resources by reducing the demand on virgin aggregates.

2. In July 2002, Government set up a pilot recycling plant in Tuen Mun Area 38 to recycle hard C&D materials into aggregates. The plant produces coarse recycled aggregates as well as fine aggregates (nominal size = 5 mm) as a by-product. Coarse aggregates can be used as road sub-base materials, engineering fill materials and in concrete production. However, there is limited usage for the fine aggregates, and one possibility is to use the material in lieu of virgin aggregates for production of concrete paving units. In order to explore the feasibility of such use, the Hong Kong Polytechnic University (HKPU) in collaboration with Government has conducted field trials, which have affirmed the performance of the concrete paving units made of recycled aggregates for use in pavement and road works.

3. Since April 2003, the Highways Department has incorporated in its maintenance contracts a particular specification on the use of concrete paving units made of recycled-aggregates. The particular specification has recently been revised taking into account findings of the HKPU's field trials, with a view to promoting the use of concrete paving units made of recycled aggregates in public works projects.

Scope

4. This Circular is applicable to public works contracts requiring the use of concrete paving units. It supplements WBTC No. 12/2002 by promulgating a particular specification to facilitate the use of concrete paving units made of recycled aggregates for public works projects. The paving units can be used in road works and construction of pavement.

5. The Director of Housing is adopting the same policy for public housing contracts.

Effective Date

6. This Circular is applicable to public works contracts for which tenders are invited on or after **1 December 2004**.

Effect on Existing Circulars

7. This Circular has no effect on existing circulars.

Policy

8. Where concrete paving units are required for pavement and road works, the project departments should use concrete paving units made of recycled aggregates in accordance with the particular specification attached in Appendix A. However, provisions should be included in the contract to allow the contractor to revert back to using concrete paving units made of virgin aggregates, in order to cater for exceptional circumstances when there is an unexpected shortage of supply of recycled aggregates.

Further Enquiries

9. For further enquiries on this Circular, please contact AS(WP)1 of this Bureau.

(C S Wai)
Deputy Secretary for the Environment,
Transport and Works (Works) 2

Particular Specification (PS) for Precast Concrete Units for Paving

Notes:

- (i) *Clause 11.65 of this PS is related to the use of recycled aggregates.*
- (ii) *Delete Part 7 of Section 11 and Appendix 11.1 of General Specification for Civil Engineering Works and replace them by the following:*

SECTION 11 MISCELLANEOUS ROADWORKS

PART 7: PRECAST CONCRETE UNITS FOR PAVING

GLOSSARY OF TERMS

<i>Unit</i>	11.60	(1)	Unit is a term used to describe a precast concrete paving slab, block or sett unless otherwise specified by the Engineer.
		(2)	Depending on their quality, units are classified as either Grade A or Grade B as follows: <ul style="list-style-type: none">- Grade A units shall comply with all the clauses of this PS.- Grade B units shall comply with all the clauses of this PS except those stipulated for Grade A units only.

Materials

<i>Units</i>	11.61	(1)	The dimensions of units shall be within 3 mm of the specified dimensions unless otherwise stated; chamfers shall not exceed 5 mm in width and depth or shall be round unless otherwise approved by the Engineer.
--------------	-------	-----	--

- (2) Units may incorporate integral spacer nibs to aid the laying but these spacer nibs shall not be included in the size of the units.
- (3) Units shall come in wide ranges of colours to facilitate pavement design by the Engineer. The colours of units shall be consistent over the area to be paved, stable and fade resistant under any outdoor climate situations.
- (4) Units shall not exhibit defects such as cracking or flaking.
- (5) Units shall be free from any surface sealant unless otherwise directed by the Engineer.

Precast concrete paving slabs 11.62

- (1) Paving slabs shall be square or rectangular of metric size 200 mm x 300 mm or 300 mm x 300 mm unless otherwise specified by the Engineer.
- (2) Paving slabs shall be 60 mm thick for footpaths. Paving slabs of other thickness may be used if approved by the Engineer.

Precast concrete paving blocks 11.63

- (1) Paving blocks shall be as shown in Highways Department Standard Drawing [*relevant drawing no. to be specified by the project office, e.g. the latest version of H5101, H5102 etc.*], unless otherwise specified by the Engineer. 200 x 200 x 60 mm paving units shall be considered as paving blocks.
- (2) Paving blocks shall be 60 mm thick for footpaths and 80 mm thick for carriageways and vehicular accesses. Paving blocks of other thickness may be used if approved by the Engineer.

- Precast concrete paving setts*** 11.64
- (1) Paving setts shall be square of metric size 100 mm x 100 mm unless otherwise specified by the Engineer.
 - (2) Paving setts shall be 60 mm thick for footpaths and 80 mm thick for carriageways and vehicular accesses. Paving setts of other thickness may be used if approved by the Engineer.

- Concrete & Use of Recycled Aggregates*** 11.65
- (1) Concrete for units in footways and cycle tracks shall be Grade 30; concrete for units in carriageways or areas to which vehicles will have access shall be Grade 45.
 - (2) Aggregates for concrete shall comply with the following requirements:
 - (a) The aggregates shall contain not less than 70% by weight of recycled aggregates.
 - (b) The recycled fine aggregates shall constitute not less than 40% by weight of the total recycled aggregates.
 - (c) Coarse recycled aggregates shall be retained on a 5mm BS test sieve.
 - (d) Fine recycled aggregates shall all pass a 5mm BS test sieve.
 - (e) The recycled aggregates shall contain not more than 0.5% of wood and other materials less dense than water by using the manual sorting test method in accordance with BRE Digest 433.

- (f) The recycled aggregates shall contain not more than 1% of other foreign materials (e.g. metals, plastics, clay lumps, asphalt and tar, glass, etc.) by using the manual sorting test method in accordance with BRE Digest 433.
- (g) The recycled aggregates shall be the crushed inert construction and demolition materials produced from the crushing plant of the Civil Engineering and Development Department or other local sources approved by the Engineer.
- (h) The nominal maximum aggregate size of aggregates shall be 10 mm.

(3) Notwithstanding sub-clause (2) above, the Contractor may propose for the Engineer's approval the use of virgin aggregates in lieu of recycled aggregates in the concrete when there is a shortage of supply of recycled aggregates.

Additional requirements for Grade A units

- 11.66 (1) Grade A units shall have an abrasion resistance of not more than 23 mm to BS 6717:2001.
- (2) Colour Pigments for Grade A units shall comply with BS 1014 :1975. They shall be UV-stable and shall be iron oxides, chrome oxide, titanium oxide or cobalt aluminium oxide unless otherwise approved by the Engineer.

Sand

- 11.67 (1) Sand for bedding units shall have the particle size distribution stated in Table 11.1. The sand shall have a moisture content exceeding 4% and not exceeding 8% at the time of laying.

- (2) Sand for filling joints between precast units shall have the particle size distribution stated in Table 11.2. The sand shall have a moisture content of less than 0.5% at the time of filling joints.

Table 11.1: Particle size distribution of sand for bedding units

BS test sieve size	Percentage by mass passing
10 mm	100
5 mm	85 - 100
2.36 mm	65 - 100
1.18 mm	40 - 98
600 μ m	25 - 72
300 μ m	10 - 35
150 μ m	0 - 15
75 μ m	0 - 10

Table 11.2: Particle size distribution of sand for filling joints between units

BS test sieve size	Percentage by mass passing
2.36 mm	100
1.18 mm	90 - 100
600 μ m	60 - 90
300 μ m	30 - 60
150 μ m	15 - 30
75 μ m	5 - 10

SUBMISSIONS

- Particulars of paving units* 11.68 (1) The Contractor shall submit the following particulars of the proposed materials and methods of construction for the paving units to the Engineer:
- (a) name and address of manufacturer,
 - (b) a certificate from the manufacturer showing the source and the particle size distribution of the recycled aggregates,
 - (c) a certificate from the manufacturer showing the manufacturer's name, the date and place of manufacture, and results of tests for:
 - compressive strength of concrete cubes at 28 day,
 - bending strength of paving slabs to BS 7263-1: 2001; and
 - compressive strength of paving blocks and setts to Appendix 11.1 of this PS.
 - (d) drawings showing the layout of the units within the paved area, and
 - (e) where recycled aggregates are not used, the Contractor shall submit the following additional particulars to the Engineer:
 - a written confirmation from the manufacturer confirming the reasons why recycled aggregates are not used, e.g. shortage in supply of recycled aggregates in the market; and

- proposed quantities of paving units for which recycled aggregates are not used.

(2) The particulars as required under Clause 11.68 (1) shall be submitted to the Engineer for approval of the source, type and layout of the units at least 14 days before laying of units starts.

Particulars of units - additional requirements for Grade A units

11.69

- (1) The following particulars of the proposed materials for Grade A units shall be submitted to the Engineer:
- (a) A certificate from the manufacturer showing the results of tests for:
- dimensional deviations of paving slabs to BS 7263-1: 2001;
 - dimensional deviations of paving blocks and setts to BS6717: 2001;
 - slip/skid resistance value of paving slabs to BS 6677: Part 1:1986;
 - slip/skid resistance value of paving blocks to BS 6677: Part 1:1986, or unpolished slip/skid resistance value of paving blocks to BS 6717: 2001;
 - slip/skid resistance value of paving setts to BS EN 1342: 2001;
 - 24-hour cold water absorption value of paving slabs, blocks and setts to AS/NZS 4456.14: 1997; and
 - abrasion resistance of paving slabs, blocks and setts to BS 6717: 2001.

Samples of materials

11.70 Samples of each type of units shall be submitted to the Engineer for approval of the source and type of each unit at the same time as particulars of the units are submitted.

Samples of materials - additional requirements for Grade A units

11.71 (1) Samples of each type of Grade A units showing the actual size, colour, variation in colour, finish/texture as specified, and general characteristics of the appearance shall be submitted to the Engineer for approval at the time as particulars of the units are submitted.

(2) Samples submitted to the Engineer shall be subject to a visual inspection by the Engineer and shall comply with the following requirements:

(a) when examined in accordance with BS 6717: 2001, there shall not be significant visible differences in colour and texture between any samples;

(b) when examined in accordance with BS 6717: 2001, the samples shall not exhibit defects such as cracking, flaking or dislodging of aggregates;

(c) fine materials shall not be easily dislodged from the surfaces of any samples during gentle manual handling; and

(d) the edges of all samples shall be sharp and straight without any defect.

HANDLING AND STORAGE OF MATERIALS

- Handling and storage of units* 11.72 Units shall be handled and stored on pallets to avoid damage to corners and chamfer edges. Pallets shall be stored on a level base and in a manner which will not result in damage or contamination to the units. The units shall be protected from damage and damaged units shall not be used unless permitted by the Engineer.
- Storage of sand* 11.73 Sand for filling joints between units shall be stored in waterproof bags and shall be kept under cover until use.
-

LAYING UNITS

- Laying units* 11.74
- (1) Units shall not be laid until the layout of the units within the paved area has been approved by the Engineer.
 - (2) Kerbs and edgings shall be completed before the units are laid; the compressive strength of the concrete used for in-situ concrete kerbs and edgings shall be at least 20 MPa before units are laid.
 - (3) Measures shall be taken to prevent water draining across or through the area during laying, bedding and compaction of the units.
 - (4) Laying of units shall start as soon as practicable after the formation has been completed. The formation shall be protected as stated in GS Clause 6.52 until laying starts.

- (5) Paving blocks for carriageways and paved areas to which vehicles will have access shall be laid in a herringbone pattern unless otherwise stated in the Contract.
- (6) Units shall be cut to size where required using mechanical cutting devices. The cut edge shall be true to line and free from chips and cracks.
- (7) The units shall be laid to any design or pattern specified by the Engineer. The design or pattern may involve a single colour or a combination of different colours.

Laying sand

11.75

- (1) A layer of sand shall be laid and shall be screeded and tamped to a uniform depth over the complete width of the area to be paved. The quantity and thickness of sand shall be appropriate to the methods of preparation of the sand layer, and shall be sufficient to give the required nominal thickness of the sand layer after compaction of the sand and units.
- (2) The sand layer shall not be disturbed by additional compaction, footmarks or other damage after the layer has been screeded and tamped to the required level and before the units are laid.

***Bedding paving
slabs***

11.76

- (1) Paving slabs shall be laid on the prepared sand layer immediately after screeding and tamping in such a manner that the sand is not disturbed.

- (2) Paving slabs shall be adjusted to form uniform joints between 2 mm and 3 mm wide and shall be bedded into the final position using a wooden mallet or a plate vibrator fitted with a rubber base-pad.
- (3) Paving slabs shall not be bedded within 1 m of an unrestrained edge of the screeded sand layer.
- (4) Final levelling of the paving slabs shall be carried out as soon as practicable after bedding and before changes in the moisture content of the prepared sand layer occur.
- (5) Damaged paving slabs shall be immediately removed and replaced.

Bedding paving blocks and setts 11.77

- (1) Paving blocks and setts shall be laid on the prepared sand layer immediately after screeding and tamping in such a manner that the sand is not disturbed. Paving blocks and setts shall be individually laid on the prepared sand layer by manual methods or in clusters by mechanical methods.
- (2) Paving blocks and setts shall be laid in such a manner that the blocks and setts are not in direct contact with each other and that uniform joints of between 2 mm and 3 mm wide are formed. Paving blocks and setts shall be bedded flush by at least two passes of a heavy-duty plate compactor fitted with a rubber base-pad.
- (3) Final levelling of the paving blocks and setts shall be carried out as soon as practicable after bedding and before changes in the moisture content of the prepared sand layer occur.

- (4) Paving blocks and setts shall not be bedded within 1 m of an unrestrained edge of the screeded sand layer.
- (5) Damaged paving blocks and setts shall be immediately removed and replaced.

***Filling joints
and compaction
of units***

11.78

- (1) After the units have been bedded, sand for filling joints shall be spread over the surface of the units and brushed into the joints in such a manner that all joints are completely filled.
- (2) Joints shall be filled as soon as practicable after bedding and on the day the units are laid and bedded.
- (3) After all joints are completely filled with sand, units shall be fully compacted by using a plate compactor fitted with a rubber base-pad. Additional sand shall be added to refill the joints as required and compacted into the joints by using the plate compactor with two or more passes.
- (4) Carriageways and paved areas with regular heavy traffic shall be compacted by at least ten evenly-spaced passes of a pneumatic tyred roller having a gross weight of between 10 t and 12 t, or by a plate compactor which shall have the following capacity:
 - minimum plate area of 0.25 m²;
 - minimum effective force per unit area of plate of 75 kN/ m²;
 - frequency of 65 –100 Hz; and
 - minimum mass of 200 kg.

Other suitable compacting equipment to the approval of the Engineer can be used. Sand shall

be added as required and brushed and compacted into the joints.

- (5) Units shall not be compacted closer than 1 m behind the laying edge of the units other than on completion of the paved area against a kerb or edging.
- (6) Excess sand shall be removed after completion of compaction.
- (7) Damaged units shall be immediately removed and replaced.

***Mortar and
concrete seal***

11.79 Pigmented mortar or concrete shall be placed to full depth of the units to fill up the gaps between units and adjacent kerbs, edgings, quadrants, covers, frames and other hardware. The work shall only be carried out upon the approval by the Engineer. Unless otherwise instructed by the Engineer, colour of pigmented mortar or concrete shall match the colour of the adjacent units.

REINSTATEMENT OF UNITS

***Reinstatement
of units***

- 11.80
- (1) If excavation is to be carried out in areas paved with units, the units shall be extracted by manual methods for a distance of at least 300 mm beyond the limit of the excavation.
 - (2) Unbroken units shall be thoroughly cleaned to remove all sand and deleterious material. The units shall be stacked on pallets for re-use.
 - (3) Units to be re-used shall be re-laid in accordance with Clauses 11.74 to 11.79.

TOLERANCES

<i>Levels</i>	11.81	The level of paved areas constructed using units shall be within 3 mm of the specified level. The difference in level of adjacent units shall not exceed 2 mm.
---------------	-------	--

TESTING

<i>Batching</i>	11.82	<p>(1) A batch of units shall be any quantity of paving slabs, blocks, or setts of the same type, size, and finish, of the same concrete grade, manufactured in the same place, covered by the same certificates and delivered to the Site at any one time. Paving slabs, blocks, or setts of different colours can be grouped together to form their respective batches provided that they are manufactured by the same type of materials and production methods.</p> <p>(2) Sampling shall be carried out at random. The sample shall comprise units that are distributed throughout the batch.</p>
<i>Testing requirements for units</i>	11.83	<p>(1) Paving slabs shall be tested for bending strength as stated in Clause 11.84.</p> <p>(2) Paving blocks shall be tested for compressive strength as stated in Clause 11.85.</p> <p>(3) Paving setts need not be tested for bending strength, compressive strength or slip/skid resistance unless otherwise required by the Engineer.</p>

***Bending
strength test of
paving slabs***

- 11.84
- (1) One sample of units in a batch shall be provided from every 1000 m² of units or part thereof. A batch with units for area(s) less than 1000 m² may be added to the untested previous or following batch(es) as the case may be for testing purposes. The number of specimens in each sample shall be 8.
 - (2) Each sample of paving slabs shall be tested to determine the bending strength to BS 7263-1: 2001.
 - (3) The mean bending strength of a sample of paving slabs shall not be less than 3.7 MPa with bending strength of individual paving slabs not less than 3.0 MPa.

***Compressive
strength test of
paving blocks***

- 11.85
- (1) One sample of units in a batch shall be provided from every 1000 m² of units or part thereof. A batch with units for area(s) less than 1000 m² may be added to the untested previous or following batch(es) as the case may be for testing purposes. The number of specimens in each sample shall be 8. For paving blocks of size 200x200x60mm, specimens of size 200x100x60mm shall be cut from these blocks in accordance with Clause 11.74 (6) to form samples.
 - (2) Each sample of paving blocks shall be tested to determine the characteristic compressive strength at 28 days.
 - (3) The method of testing shall be as stated in Appendix 11.1.
 - (4) The characteristic compressive strength of a sample of paving blocks shall be:

- (a) 30 MPa for paving blocks in footways and cycle tracks, and
- (b) 45 MPa for paving blocks in carriageways and paved areas to which vehicles will have access.

Additional testing for Grade A units: dimensional deviation of paving slabs, blocks and setts

- 11.86
- (1) One sample of units in a batch shall be provided from every 1000 m² of units or part thereof. A batch with units for area(s) less than 1000 m² may be added to the untested previous or following batch(es) as the case may be for testing purposes. The number of specimens in each sample shall be 8. The sample can be used for other tests.
 - (2) The overall dimensions and thickness of each sample of paving slabs shall be measured in accordance with BS 7263-1: 2001.
 - (3) The overall dimensions and thickness of each sample of paving blocks and setts shall be measured in accordance with BS 6717: 2001.
 - (4) The tolerances for the dimensions of each individual units shall be within ± 2 mm for length and width, and ± 3 mm for thickness.

Additional testing for Grade A units: slip/ skid resistance of paving slabs and blocks

- 11.87
- (1) One sample of units in a batch shall be provided from every 1000 m² of units or part thereof. A batch with units for area(s) less than 1000 m² may be added to the untested previous or following batch(es) as the case may be for testing purposes. The number of specimens in each sample shall be 5. The sample can be used for other tests.
 - (2) Each sample of paving slabs shall be tested to determine the slip/ skid resistance to BS 6677: Part 1: 1986.

- (3) Each sample of paving blocks shall be tested to determine the slip/skid resistance to BS 6677: Part 1: 1986.
- (4) The mean slip/skid resistance of a sample shall not be less than 45 Skid Resistance Value for units in footways and cycle tracks.
- (5) Notwithstanding sub-clause (4) above, if considered appropriate by the Engineer for application on steep roads, pavements with steep pedestrian crossings or exceptional high cross fall, or other difficult site conditions, the required slip/skid resistance of the units in footways and cycle tracks may be increased up to 60 Skid Resistance Value.

Additional testing for Grade A units: water absorption value of paving slabs and blocks

11.88

- (1) One sample of units in a batch shall be provided from every 1000 m² of units or part thereof. A batch with units for area(s) less than 1000 m² may be added to the untested previous or following batch(es) as the case may be for testing purposes. The number of specimens in each sample shall be 10. The sample can be used for other tests.
- (2) Each sample of paving slabs and blocks shall be tested to determine the 24-hour cold water absorption value to AS/NZS 4456.14: 1997.
- (3) The sample shall have a characteristic water absorption value not more than 6% by 24-hour cold immersion method to AS/NZS 4456.14: 1997.
- (4) The characteristic water absorption value (W_c) shall be calculated from the following equation:

$$W_c = W_m + 1.65 X_s \%$$

where:

- W_m is the average water absorption rate of the sample

 - X_s is the unbiased standard deviation as stated in AS/NZS 4456.2: 1997.
-

APPENDIX 11.1

DETERMINATION OF CHARACTERISTIC COMPRESSIVE STRENGTH OF PAVING BLOCKS

- Scope* 11.1.1 This method covers the determination of the characteristic compressive strength at 28 days of paving blocks by means of a load test.
- Apparatus* 11.1.2 The following apparatus is required:
- (a) A compression test machine complying with CS1. Bearing faces of the platens on the test machine shall be at least as large as the paving blocks and shall have a flatness tolerance of 0.05 mm.
 - (b) If a test machine with platens smaller than the paving blocks is used, auxiliary plates of adequate size shall be placed centrally between the platens and the paving block to be tested. The flatness tolerance of the bearing faces of the auxiliary platens measured in accordance with CS1 shall not be more than 0.05 mm and the thickness of the plates shall be at least 25 mm.
 - (c) Two pieces of packing, each with a thickness of between 5 mm and 6 mm and dimensions exceeding the paving block by between 15 mm and 25 mm. The packing shall be plywood, chipboard or medium density hardboard.
- Procedure* 11.1.3 The procedure shall be as follows:
- (a) The paving block shall be capped on the running surface and underside with a suitable capping

material in accordance with Clause 15.5.2 of CS1 and immersed in water for at least 24 hours before compression.

- (b) The paving block shall be placed symmetrically on the lower platen of the test machine, between the two pieces of packing with the running surface facing upwards.
- (c) Load shall be applied without shock and shall be steadily increased at a constant rate within a stress range of between 150 kPa/s and 700 kPa/s.
- (d) The load at which the paving block fractures shall be recorded as the breaking load.
- (e) The test shall be repeated for the other seven paving blocks.

Calculation

11.1.4

- (1) The compressive strength (C) of each paving block shall be calculated from the equation:

$$C = \frac{W}{A} \times \frac{2.5}{1.5 + \frac{L}{H}} \quad \text{MPa}$$

where:

- W is the breaking load (N)
- A is the nominal gross plan area based on the manufacturing dimensions of the paving blocks or the area of the tested portion if the block size is reduced for testing (mm²)
- L is the lesser of the two plan dimensions (mm)
- H is the thickness of the block (mm)

- (2) The unbiased standard deviation (s) shall be calculated from the following equation:

$$s = \sqrt{\frac{\sum C^2 - n(Cm)^2}{n-1}} \quad \text{MPa}$$

where:

- n is the number of paving blocks
- $\sum C^2$ is the sum of the square of the compressive strengths of the n number of paving blocks (MPa)
- Cm is the average of the compressive strengths of the n number of paving blocks

- (3) The characteristic strength (Cc) of the batch shall be calculated from the following equation:

$$C_c = C_m - 1.65s \quad \text{MPa}$$

where:

- Cm is the average of the compressive strengths of the n number of paving blocks as stated in Clause 11.1.4(2)
- s is the unbiased standard deviation as stated in Clause 11.1.4(2)

Reporting of results

11.1.5 The following shall be reported:

- (a) Source, name of manufacturer and type of paving blocks.

- (b) Identification marks of paving blocks.
- (c) Date of manufacture of paving blocks.
- (d) Nominal gross plan area of each block to the nearest 100 mm².
- (e) Nominal height of each block to the nearest mm.
- (f) Breaking load of each block to the nearest kN.
- (g) Compressive strength of each block to the nearest MPa.
- (h) Average of the n number of compressive strengths to the nearest MPa.
- (i) Unbiased standard deviation to the nearest MPa.
- (j) Characteristic compressive strength to the nearest MPa.
- (k) That the test method used was in accordance with this Specification.